Claims

[c1]   1.A method for planning minimally invasive direct coronary artery bypass (MIDCAB) for a patient, the method
comprising:

obtaining acquisition data from a medical imaging system;

generating a 3D model of the coronary arteries and one
or more cardiac chambers of interest of the patient;

identifying one or more anatomical landmarks on said
3D model;

registering saved views of said 3D model on an interventional system; and

visualizing one or more of said registered saved views
with said interventional system.

[c2]   2.The method of claim 1, further comprising identifying,
from said 3D model, orientation, size and dimensions of
the coronaries and ventricles.

[c3]   3.The method of claim 1, wherein said obtaining acquisition data is implemented with protocols directed for
imaging the coronary arteries and ventricles.

[c4]   4.The method of claim 3, further comprising utilizing

post processing software to process said acquisition data so as to generate interior views of the coronary arteries and ventricles.

[c5]   5. The method of claim 4, wherein said 3D model and said interior views are visualized through a display screen associated with said interventional system.

[c6]   6. The method of claim 1, further comprising registering MIDCAB instruments on said interventional system.

[c7]   7. The method of claim 1, further comprising measuring size, extent and number of lesions in the coronary arteries needing MIDCAB.

[c8]   8. The method of claim 1, wherein said obtaining acquisition data is EKG gated.

[c9]   9. A method for planning minimally invasive direct coronary artery bypass (MIDCAB) for a patient, the method comprising:
obtaining acquisition data from a medical imaging system using a protocol directed toward the coronary arteries and left ventricle;
segmenting said acquisition data using a 3D protocol so as to visualize the coronary arteries and the left ventricle;
generating a 3D model of the coronary arteries and the

left ventricle of the patient;

identifying one or more anatomical landmarks on said 3D model;

registering saved views of said 3D model on an interventional system;

visualizing one or more of said registered saved views with said interventional system; and

identifying, from said 3D model, orientation and any anomalies associated with the coronary arteries and the left ventricle.

[c10]   10. The method of claim 9, further comprising utilizing post processing software to process said acquisition data so as to generate interior views of the coronary arteries and ventricles.

[c11]   11. The method of claim 10, wherein said 3D model and said interior views are visualized through a display screen associated with said interventional system.

[c12]   12. The method of claim 9, wherein said obtaining acquisition data is EKG gated.

[c13]   13. The method of claim 9, further comprising registering MIDCAB instruments on said interventional system.

[c14]   14. The method of claim 9, further comprising measuring size, extent and number of lesions in the coronary arter-

ies needing MIDCAB.

15. The method of claim 9, wherein said medical imaging system is one of a computed tomography system, a magnetic resonance imaging system and an ultrasound system.

16. A method for planning minimally invasive direct coronary artery bypass (MIDCAB) for a patient, the method comprising:

obtaining acquisition data from a cardiac computed to-mography (CT) imaging system using a protocol directed toward the coronary arteries and left ventricle;

segmenting said acquisition data using a 3D protocol so as to visualize the coronary arteries and left ventricle, in-cluding interior views of the coronary arteries;

generating a 3D model of the coronary arteries and left ventricle of the patient;

identifying one or more anatomical landmarks on said 3D model;

registering saved views of said 3D model on a fluo-roscopy system; and

visualizing one or more of said registered saved views with said fluoroscopy system; and

identifying, from said 3D model, orientation and any anomalies associated with the coronary arteries and the left ventricle.

[c17] 17. The method of claim 16, further comprising utilizing post processing software to process said acquisition data so as to interior views of the coronary arteries and ventricles.

[c18] 18. The method of claim 17, wherein said 3D model and said immersible views are visualized through a display screen associated with said fluoroscopy system.

[c19] 19. The method of claim 16, wherein said obtaining acquisition data is EKG gated.

[c20] 20. The method of claim 16, further comprising registering MIDCAB instruments on said interventional system.

[c21] 21. The method of claim 20, further comprising measuring size, extent and number of lesions in the coronary arteries needing MIDCAB.

[c22] 22. A system for planning minimally invasive direct coronary artery bypass (MIDCAB) for a patient, comprising:
a medical imaging system for generating acquisition data;
an image generation subsystem for receiving said acquisition data and generating one or more images of the coronary arteries and the left ventricle of the patient;
an operator console for identifying one or more anatom-

ical landmarks on said one or more images;

a workstation including post processing software for registering saved views of said 3D model on an interventional system; and

wherein said interventional system is configured for visualizing one or more of said registered saved views therewith, quantifying distance and location information for a cardiac point of interest, and identifying an incision location and path for MIDCAB based on said quantified distance and location information for said cardiac point of interest.

[c23] 23. The system of claim 22, wherein said image generation subsystem is configured with protocols directed for imaging the coronary arteries and ventricles.

[c24] 24. The system of claim 23, wherein said post processing software is further configured to process said acquisition data so as to generate interior views of the coronary arteries and ventricles.

[c25] 25. The system of claim 24, further comprising a display screen associated with said interventional system, said display screen for visualizing said 3D model and said interior views.

[c26] 26. The system of claim 22, wherein said interventional

system is configured for registering MIDCAB instruments therewith.

[c27] 27. The system of claim 22, wherein said image generating subsystem is EKG gated.